

SEQUENCE LISTING

<110> Hughes, Martin J G

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<120> Genes and Proteins, and Their Use

<130> GJE-70

<140> US 09/868,352

<141> 2001-06-15

<160> 35

<170> PatentIn version 3.1

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<212> DNA

<213> Streptococcus agalactiae

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<221> CDS

<222> (1)..(582)

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| Met Ile Pro Val Val Ile Glu Gln Thr Ser Arg Gly Glu Arg Ser Tyr | |
| 1 5 10 15 | |
| gat att tac tca cgt ctt tta aaa gat cgt att att atg ttg aca ggc | 96 |
| Asp Ile Tyr Ser Arg Leu Leu Lys Asp Arg Ile Ile Met Leu Thr Gly | |
| 20 25 30 | |
| caa gtt gag gat aat atg gcc aat agt atc att gca cag tta ttg ttt | 144 |
| Gln Val Glu Asp Asn Met Ala Asn Ser Ile Ile Ala Gln Leu Leu Phe | |
| 35 40 45 | |
| ctc gat gca caa gat aat aca aag gat att tac ctt tat gtc aat aca | 192 |
| Leu Asp Ala Gln Asp Asn Thr Lys Asp Ile Tyr Leu Tyr Val Asn Thr | |
| 50 55 60 | |
| cca ggt ggt tca gta tcg gct gga ctt gct att gtg gac acc atg aac | 240 |
| Pro Gly Gly Ser Val Ser Ala Gly Leu Ala Ile Val Asp Thr Met Asn | |
| 65 70 75 80 | |
| ttc att aaa tcg gac gta cag acg att gtt atg ggg atg gct gct tcg | 288 |
| Phe Ile Lys Ser Asp Val Gln Thr Ile Val Met Gly Met Ala Ala Ser | |
| 85 90 95 | |
| atg gga acc att att gct tca agt ggt gct aaa gga aaa cgt ttt atg | 336 |
| Met Gly Thr Ile Ile Ala Ser Ser Gly Ala Lys Gly Lys Arg Phe Met | |
| 100 105 110 | |
| tta ccg aat gca gaa tat atg atc cac caa cca atg ggc gga aca ggc | 384 |
| Leu Pro Asn Ala Glu Tyr Met Ile His Gln Pro Met Gly Gly Thr Gly | |
| 115 120 125 | |
| gga ggt aca cag caa tct gat atg gct atc gct gct gag cat ctt tta | 432 |
| Gly Gly Thr Gln Gln Ser Asp Met Ala Ile Ala Ala Glu His Leu Leu | |
| 130 135 140 | |

aaa acg cgt cat act tta gaa aaa atc tta gct gat aat tct ggt caa 480
 Lys Thr Arg His Thr Leu Glu Lys Ile Leu Ala Asp Asn Ser Gly Gln
 145 150 155 160

 tct att gaa aaa gtc cat gat gat gca gag cgt gat cgt tgg atg agt 528
 Ser Ile Glu Lys Val His Asp Asp Ala Glu Arg Asp Arg Trp Met Ser
 165 170 175

 gct caa gaa aca ctt gat tat ggc ttt att gat gaa atc atg gct aat 576
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 180 185 190

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 Asn Glu

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<400> 2

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 Asp Ile Tyr Ser Arg Leu Leu Lys Asp Arg Ile Ile Met Leu Thr Gly
 20 25 30

 Gln Val Glu Asp Asn Met Ala Asn Ser Ile Ile Ala Gln Leu Leu Phe
 35 40 45

 Leu Asp Ala Gln Asp Asn Thr Lys Asp Ile Tyr Leu Tyr Val Asn Thr
 50 55 60

 Pro Gly Gly Ser Val Ser Ala Gly Leu Ala Ile Val Asp Thr Met Asn
 65 70 75 80

 Phe Ile Lys Ser Asp Val Gln Thr Ile Val Met Gly Met Ala Ala Ser
 85 90 95

Met Gly Thr Ile Ile Ala Ser Ser Gly Ala Lys Gly Lys Arg Phe Met
 100 105 110

Leu Pro Asn Ala Glu Tyr Met Ile His Gln Pro Met Gly Gly Thr Gly
 115 120 125

Gly Gly Thr Gln Gln Ser Asp Met Ala Ile Ala Ala Glu His Leu Leu
 130 135 140

Lys Thr Arg His Thr Leu Glu Lys Ile Leu Ala Asp Asn Ser Gly Gln
 145 150 155 160

Ser Ile Glu Lys Val His Asp Asp Ala Glu Arg Asp Arg Trp Met Ser
 165 170 175

Ala Gln Glu Thr Leu Asp Tyr Gly Phe Ile Asp Glu Ile Met Ala Asn
 180 185 190

Asn Glu

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<213> Streptococcus agalactiae

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48

Ile Arg Ala Tyr Ser Gly Pro Leu Ser Val Phe Leu Pro Arg Phe Lys
 1 5 10 15

gct tgt gat ata ata gtc aat gtg agg agg act atc atg tta ttt aag 96
 Ala Cys Asp Ile Ile Val Asn Val Arg Arg Thr Ile Met Leu Phe Lys
 20 25 30

gaa aaa att cct gga cta ata tta tgc ttt att att gct ata cca tct 144
 Glu Lys Ile Pro Gly Leu Ile Leu Cys Phe Ile Ile Ala Ile Pro Ser
 35 40 45

tgg ttg ctt ggg ctt tat ctc cct tta ata gga gca cca gtc ttt gct 192
 Trp Leu Leu Gly Leu Tyr Leu Pro Leu Ile Gly Ala Pro Val Phe Ala
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 65 70

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<213> Streptococcus agalactiae

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 1 5 10 15

Ala Cys Asp Ile Ile Val Asn Val Arg Arg Thr Ile Met Leu Phe Lys
 20 25 30

Glu Lys Ile Pro Gly Leu Ile Leu Cys Phe Ile Ile Ala Ile Pro Ser
 35 40 45

Trp Leu Leu Gly Leu Tyr Leu Pro Leu Ile Gly Ala Pro Val Phe Ala
 50 55 60

Ile Leu Ile Gly Ile Ile Val Gly
 65 70

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| Met | Asn | Lys | Arg | Arg | Lys | Leu | Ser | Lys | Leu | Asn | Val | Lys | Lys | Gln | His | |
| 1 | | | 5 | | | | | 10 | | | | | | 15 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| tta | gct | tat | gga | gct | atc | act | tta | gta | gcc | ctt | ttt | tca | tgt | att | ttg | 96 |
| Leu | Ala | Tyr | Gly | Ala | Ile | Thr | Leu | Val | Ala | Leu | Phe | Ser | Cys | Ile | Leu | |
| | | 20 | | | | | 25 | | | | | 30 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gct | gta | acg | gtc | atc | ttt | aaa | agt | tca | caa | gtt | act | act | gaa | tct | ttg | 144 |
| Ala | Val | Thr | Val | Ile | Phe | Lys | Ser | Ser | Gln | Val | Thr | Thr | Glu | Ser | Leu | |
| | | 35 | | | | 40 | | | | | 45 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| tca | aaa | gca | gat | aaa | gtt | cgc | gta | gcc | aaa | aaa | tca | aaa | atg | act | aag | 192 |
| Ser | Lys | Ala | Asp | Lys | Val | Arg | Val | Ala | Lys | Lys | Ser | Lys | Met | Thr | Lys | |
| | 50 | | | | 55 | | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gcg | aca | tct | aaa | tca | aaa | gta | gaa | gat | gta | aaa | cag | gct | cca | aaa | cct | 240 |
| Ala | Thr | Ser | Lys | Ser | Lys | Val | Glu | Asp | Val | Lys | Gln | Ala | Pro | Lys | Pro | |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| tct | cag | gca | tct | aat | gaa | gcc | cca | aaa | tca | agt | tct | caa | tct | aca | gaa | 288 |
| Ser | Gln | Ala | Ser | Asn | Glu | Ala | Pro | Lys | Ser | Ser | Ser | Gln | Ser | Thr | Glu | |
| | | | 85 | | | | | 90 | | | | | | 95 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gct | aat | tct | cag | caa | caa | gtt | act | gcg | agt | gaa | gag | acg | gct | gta | gaa | 336 |
| Ala | Asn | Ser | Gln | Gln | Gln | Val | Thr | Ala | Ser | Glu | Glu | Thr | Ala | Val | Glu | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| caa | gca | gtt | gta | aca | gaa | ata | ccc | ctg | cta | cca | gtc | agg | cac | aac | aac | 384 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Gln Ala Val Val Thr Glu Ile Pro Leu Leu Pro Val Arg His Asn Asn
 115 120 125

ctt tat gct gtt act gag aca cct tac aac cct gct caa cca cca gac 432
 Leu Tyr Ala Val Thr Glu Thr Pro Tyr Asn Pro Ala Gln Pro Pro Asp
 130 135 140

caa gtg gcc agg tat gag caa tgg aaa tac tgc cag gcg gtc gga tct 480
 Gln Val Ala Arg Tyr Glu Gln Trp Lys Tyr Cys Gln Ala Val Gly Ser
 145 150 155 160

gct gct gca gca caa atg gct gct gca aca gga gtc cct cag tct act 528
 Ala Ala Ala Ala Gln Met Ala Ala Ala Thr Gly Val Pro Gln Ser Thr
 165 170 175

tgg gaa cat att att gcc cgt gaa tca aat ggt aat cct aat gtt gct 576
 Trp Glu His Ile Ile Ala Arg Glu Ser Asn Gly Asn Pro Asn Val Ala
 180 185 190

aat gcc tca gga gct tca gga ctt ttc caa acg atg cca ggt tgg ggt 624
 Asn Ala Ser Gly Ala Ser Gly Leu Phe Gln Thr Met Pro Gly Trp Gly
 195 200 205

tca aca gct aca gtt cag gat caa gta att cag cta tta aag ctt att 672
 Ser Thr Ala Thr Val Gln Asp Gln Val Ile Gln Leu Leu Lys Leu Ile
 210 215 220

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 225 230

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<213> Streptococcus agalactiae

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Ala Val Thr Val Ile Phe Lys Ser Ser Gln Val Thr Thr Glu Ser Leu
 35 40 45

Ser Lys Ala Asp Lys Val Arg Val Ala Lys Lys Ser Lys Met Thr Lys
 50 55 60

Ala Thr Ser Lys Ser Lys Val Glu Asp Val Lys Gln Ala Pro Lys Pro
 65 70 75 80

Ser Gln Ala Ser Asn Glu Ala Pro Lys Ser Ser Ser Gln Ser Thr Glu
 85 90 95

Ala Asn Ser Gln Gln Gln Val Thr Ala Ser Glu Glu Thr Ala Val Glu
 100 105 110

Gln Ala Val Val Thr Glu Ile Pro Leu Leu Pro Val Arg His Asn Asn
 115 120 125

Leu Tyr Ala Val Thr Glu Thr Pro Tyr Asn Pro Ala Gln Pro Pro Asp
 130 135 140

Gln Val Ala Arg Tyr Glu Gln Trp Lys Tyr Cys Gln Ala Val Gly Ser
 145 150 155 160

Ala Ala Ala Ala Gln Met Ala Ala Ala Thr Gly Val Pro Gln Ser Thr
 165 170 175

Trp Glu His Ile Ile Ala Arg Glu Ser Asn Gly Asn Pro Asn Val Ala
 180 185 190

Asn Ala Ser Gly Ala Ser Gly Leu Phe Gln Thr Met Pro Gly Trp Gly
 195 200 205

Ser Thr Ala Thr Val Gln Asp Gln Val Ile Gln Leu Leu Lys Leu Ile
 210 215 220

Arg Ala Gln Gly Leu Ser Ala Gly Tyr Gln
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<210> 7

<211> 594

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| Met Thr Glu Pro Phe Phe Asp Lys Glu Leu Thr Cys Arg Pro Ile Glu | |
| 1 5 10 15 | |
| gcc att cct gaa ttg ttg gaa ttc gat att acc gtt cgt gga gac aac | 96 |
| Ala Ile Pro Glu Leu Leu Glu Phe Asp Ile Thr Val Arg Gly Asp Asn | |
| 20 25 30 | |
| cgt gga tgg ttc aaa gag aac ttt caa aaa gaa aaa atg ata ccg ctt | 144 |
| Arg Gly Trp Phe Lys Glu Asn Phe Gln Lys Glu Lys Met Ile Pro Leu | |
| 35 40 45 | |
| ggt ttc cca gaa agc ttc ttt gag gca gac aaa cta caa aat aat att | 192 |
| Gly Phe Pro Glu Ser Phe Phe Glu Ala Asp Lys Leu Gln Asn Asn Ile | |
| 50 55 60 | |
| tcg ttt aca aaa aaa aat act ttg cga ggt ctc cat gca gag cct tgg | 240 |
| Ser Phe Thr Lys Lys Asn Thr Leu Arg Gly Leu His Ala Glu Pro Trp | |
| 65 70 75 80 | |
| gat aaa tat gtt tcg atc gct gat gaa gga cgt gtg atc ggt act tgg | 288 |
| Asp Lys Tyr Val Ser Ile Ala Asp Glu Gly Arg Val Ile Gly Thr Trp | |
| 85 90 95 | |
| gtt gac ctc cgt gaa ggt gac agt ttt ggt aac gtt tac caa acg att | 336 |
| Val Asp Leu Arg Glu Gly Asp Ser Phe Gly Asn Val Tyr Gln Thr Ile | |
| 100 105 110 | |
| atc gat gcc tca aaa ggt att ttt gtt cca cgc ggc gtt gct aat ggt | 384 |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ile | Asp | Ala | Ser | Lys | Gly | Ile | Phe | Val | Pro | Arg | Gly | Val | Ala | Asn | Gly | | |
| | 115 | | | | | | 120 | | | | | 125 | | | | | |
| ttc | caa | ggt | ctt | tca | gat | aaa | gca | gct | tat | act | tat | ctc | ggt | aac | gat | 432 | |
| Phe | Gln | Val | Leu | Ser | Asp | Lys | Ala | Ala | Tyr | Thr | Tyr | Leu | Val | Asn | Asp | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| tat | tgg | gca | ctt | gaa | ctc | aaa | cca | aaa | tat | gct | ttc | ggt | aac | tat | gca | 480 | |
| Tyr | Trp | Ala | Leu | Glu | Leu | Lys | Pro | Lys | Tyr | Ala | Phe | Val | Asn | Tyr | Ala | | |
| | 145 | | | | 150 | | | | 155 | | | | | 160 | | | |
| gat | cca | aat | cta | ggc | att | cag | tgg | gaa | aat | ctw | gaa | gaa | gca | gaa | gtc | 528 | |
| Asp | Pro | Asn | Leu | Gly | Ile | Gln | Trp | Glu | Asn | Leu | Glu | Glu | Ala | Glu | Val | | |
| | | | | 165 | | | | 170 | | | | | 175 | | | | |
| tca | gaa | gca | gat | aag | aat | cac | cca | ctt | ctc | aaa | gat | gta | aaa | cct | ttg | 576 | |
| Ser | Glu | Ala | Asp | Lys | Asn | His | Pro | Leu | Leu | Lys | Asp | Val | Lys | Pro | Leu | | |
| | | | | 180 | | | | 185 | | | | | 190 | | | | |
| aag | aag | gaa | gat | ttg | taa | | | | | | | | | | | 594 | |
| Lys | Lys | Glu | Asp | Leu | | | | | | | | | | | | | |
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<213> Streptococcus agalactiae

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| 1 | | | | 5 | | | | 10 | | | | | | 15 | |
| Ala | Ile | Pro | Glu | Leu | Leu | Glu | Phe | Asp | Ile | Thr | Val | Arg | Gly | Asp | Asn |
| | | | 20 | | | | 25 | | | | | | 30 | | |
| Arg | Gly | Trp | Phe | Lys | Glu | Asn | Phe | Gln | Lys | Glu | Lys | Met | Ile | Pro | Leu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Gly | Phe | Pro | Glu | Ser | Phe | Phe | Glu | Ala | Asp | Lys | Leu | Gln | Asn | Asn | Ile |
| | 50 | | | | | 55 | | | | | 60 | | | | |

Ser Phe Thr Lys Lys Asn Thr Leu Arg Gly Leu His Ala Glu Pro Trp
65 70 75 80

Asp Lys Tyr Val Ser Ile Ala Asp Glu Gly Arg Val Ile Gly Thr Trp
85 90 95

Val Asp Leu Arg Glu Gly Asp Ser Phe Gly Asn Val Tyr Gln Thr Ile
100 105 110

Ile Asp Ala Ser Lys Gly Ile Phe Val Pro Arg Gly Val Ala Asn Gly
115 120 125

Phe Gln Val Leu Ser Asp Lys Ala Ala Tyr Thr Tyr Leu Val Asn Asp
130 135 140

Tyr Trp Ala Leu Glu Leu Lys Pro Lys Tyr Ala Phe Val Asn Tyr Ala
145 150 155 160

Asp Pro Asn Leu Gly Ile Gln Trp Glu Asn Leu Glu Glu Ala Glu Val
165 170 175

Ser Glu Ala Asp Lys Asn His Pro Leu Leu Lys Asp Val Lys Pro Leu
180 185 190

Lys Lys Glu Asp Leu
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<210> 9

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<213> Streptococcus agalactiae

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<222> (571)..(571)

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| Tyr Tyr Leu Ile Gly Gly Leu Ala Glu Met Gln His Val Asn His Ser | |
| 1 5 10 15 | |
| tct ttt gat aaa gca tca aaa gca gga ttt att att gct tta ggc att | 96 |
| Ser Phe Asp Lys Ala Ser Lys Ala Gly Phe Ile Ile Ala Leu Gly Ile | |
| 20 25 30 | |
| gtt tat gga gat att ggt aca agc cca ctc tat acg atg caa tca ttg | 144 |
| Val Tyr Gly Asp Ile Gly Thr Ser Pro Leu Tyr Thr Met Gln Ser Leu | |
| 35 40 45 | |
| gtt gaa aac caa ggt ggt att tct agt gtc aca gaa tcg ttt atc tta | 192 |
| Val Glu Asn Gln Gly Gly Ile Ser Ser Val Thr Glu Ser Phe Ile Leu | |
| 50 55 60 | |
| ggg tct ata tct tta atc ata tgg acc ttg aca ctt att aca act atc | 240 |
| Gly Ser Ile Ser Leu Ile Ile Trp Thr Leu Thr Leu Ile Thr Thr Ile | |
| 65 70 75 80 | |
| aag tat gtg ctt gta gct tta aag gcg gat aat cac cac gaa ggt ggt | 288 |
| Lys Tyr Val Leu Val Ala Leu Lys Ala Asp Asn His His Glu Gly Gly | |
| 85 90 95 | |
| att ttt tct tta tat acc ctt gtt aga aaa atg aca cct tgg tta att | 336 |

| | |
|---|-----|
| Ile Phe Ser Leu Tyr Thr Leu Val Arg Lys Met Thr Pro Trp Leu Ile | |
| 100 105 110 | |
| ggt ccg gct gtt att gga ggt gca acc ttg ttg tca gat gga gct ttg | 384 |
| Val Pro Ala Val Ile Gly Gly Ala Thr Leu Leu Ser Asp Gly Ala Leu | |
| 115 120 125 | |
| acg cca gct gta acc gta ctt cag ccg tta agg att aaa gta gtt cct | 432 |
| Thr Pro Ala Val Thr Val Leu Gln Pro Leu Arg Ile Lys Val Val Pro | |
| 130 135 140 | |
| agt ttg cag cat att tcc aga atc aga gta tgt tat ttt gcg acc ttg | 480 |
| Ser Leu Gln His Ile Ser Arg Ile Arg Val Cys Tyr Phe Ala Thr Leu | |
| 145 150 155 160 | |
| tta ttt act gtt act ttt gcc atc caa ggt ttg gaa cgg gtg tta ttg | 528 |
| Leu Phe Thr Val Thr Phe Ala Ile Gln Gly Leu Glu Arg Val Leu Leu | |
| 165 170 175 | |
| gaa tta ttg gcc att atg tta tat ggt ttg cct ttt ggt tta | 570 |
| Glu Leu Leu Ala Ile Met Leu Tyr Gly Leu Pro Phe Gly Leu | |
| 180 185 190 | |
| ncggtctcct tatagttttg cccatccaga agttttcaag cattaatcca tactacggtt | 630 |
| tgaaattggtt atttagtcca gagaatcata aaggatatttt tatttttag gat cta ttt | 687 |
| Asp Leu Phe | |
| tcc tgg cga caa acg gga gca gaa gca cta tac tct gac tta ggt cat | 735 |
| Ser Trp Arg Gln Thr Gly Ala Glu Ala Leu Tyr Ser Asp Leu Gly His | |
| 195 200 205 | |
| ggt ggg cgt gga aat ata cat gtt tca tgg ccg ttc gtt aag gtt gcc | 783 |
| Val Gly Arg Gly Asn Ile His Val Ser Trp Pro Phe Val Lys Val Ala | |
| 210 215 220 225 | |
| att ata ctt tct tat tgt ggg caa ggg gca tgg att tta gct aat aag | 831 |
| Ile Ile Leu Ser Tyr Cys Gly Gln Gly Ala Trp Ile Leu Ala Asn Lys | |
| 230 235 240 | |
| aac gca gga aat gaa ttg aat ccc ttt ttt gct agt att cct tcg caa | 879 |
| Asn Ala Gly Asn Glu Leu Asn Pro Phe Phe Ala Ser Ile Pro Ser Gln | |
| 245 250 255 | |
| ttt aca atg cat gtc gtt att tta gct act ttg gca gct atc atc gct | 927 |
| Phe Thr Met His Val Val Ile Leu Ala Thr Leu Ala Ala Ile Ile Ala | |
| 260 265 270 | |
| tca cag gca ctg att tct ggatcaattt accttaagtt ctgagctatg | 975 |

Ser Gln Ala Leu Ile Ser
275

cgactaaaaa tattcccaca atttcgttca acttatcctg ttgacaatat tgggtcaaac 1035
ctacatacct ggtattaatt gggtcttatt tgccattaca acctctattg gtttgctttt 1095
taagacttca gcgcacatgg aagcagcata tggattagcg ataacaatta cgatgctaata 1155
gacaactatt ttactgtctt tctttttaat tcaaaaagga gtaaagagag gtttttagcta 1215
tt 1217

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<211> 190

<212> PRT

<213> Streptococcus agalactiae

<400> 10

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1 5 10 15

Ser Phe Asp Lys Ala Ser Lys Ala Gly Phe Ile Ile Ala Leu Gly Ile
20 25 30

Val Tyr Gly Asp Ile Gly Thr Ser Pro Leu Tyr Thr Met Gln Ser Leu
35 40 45

Val Glu Asn Gln Gly Gly Ile Ser Ser Val Thr Glu Ser Phe Ile Leu
50 55 60

Gly Ser Ile Ser Leu Ile Ile Trp Thr Leu Thr Leu Ile Thr Thr Ile
65 70 75 80

Lys Tyr Val Leu Val Ala Leu Lys Ala Asp Asn His His Glu Gly Gly
85 90 95

Ile Phe Ser Leu Tyr Thr Leu Val Arg Lys Met Thr Pro Trp Leu Ile
 100 105 110

Val Pro Ala Val Ile Gly Gly Ala Thr Leu Leu Ser Asp Gly Ala Leu
 115 120 125

Thr Pro Ala Val Thr Val Leu Gln Pro Leu Arg Ile Lys Val Val Pro
 130 135 140

Ser Leu Gln His Ile Ser Arg Ile Arg Val Cys Tyr Phe Ala Thr Leu
 145 150 155 160

Leu Phe Thr Val Thr Phe Ala Ile Gln Gly Leu Glu Arg Val Leu Leu
 165 170 175

Glu Leu Leu Ala Ile Met Leu Tyr Gly Leu Pro Phe Gly Leu
 180 185 190

<210> 11

<211> 89

<212> PRT

<213> Streptococcus agalactiae

<400> 11

Asp Leu Phe Ser Trp Arg Gln Thr Gly Ala Glu Ala Leu Tyr Ser Asp
 1 5 10 15

Leu Gly His Val Gly Arg Gly Asn Ile His Val Ser Trp Pro Phe Val
 20 25 30

Lys Val Ala Ile Ile Leu Ser Tyr Cys Gly Gln Gly Ala Trp Ile Leu
 35 40 45

Ala Asn Lys Asn Ala Gly Asn Glu Leu Asn Pro Phe Phe Ala Ser Ile
 50 55 60

Pro Ser Gln Phe Thr Met His Val Val Ile Leu Ala Thr Leu Ala Ala
 65 70 75 80

Ile Ile Ala Ser Gln Ala Leu Ile Ser
 85

<210> 12

<211> 378

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(378)

<223>

<400> 12

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| atg cag gta ttt tta aat att gtc aat aaa ttc ttt gat cca gtt att | 48 |
| Met Gln Val Phe Leu Asn Ile Val Asn Lys Phe Phe Asp Pro Val Ile | |
| 1 5 10 15 | |
| cat atg ggt tgc gga gtt gtg atg cta att gtc atg aca ggt tta gcc | 96 |
| His Met Gly Ser Gly Val Val Met Leu Ile Val Met Thr Gly Leu Ala | |
| 20 25 30 | |
| atg ata ttt gga gtg aag ttt tct aaa gca ctt gaa ggt ggt att aag | 144 |
| Met Ile Phe Gly Val Lys Phe Ser Lys Ala Leu Glu Gly Gly Ile Lys | |
| 35 40 45 | |
| tta gct att gct ctt acg ggt att ggt gct att att ggt att tta act | 192 |
| Leu Ala Ile Ala Leu Thr Gly Ile Gly Ala Ile Ile Gly Ile Leu Thr | |
| 50 55 60 | |
| ggt gct ttt tcc gaa tca ctt caa gct ttt gtt aaa aat aca gga atc | 240 |
| Gly Ala Phe Ser Glu Ser Leu Gln Ala Phe Val Lys Asn Thr Gly Ile | |
| 65 70 75 80 | |
| aat cta agc att att gac gtt ggt tgg gct cca tta gca act att aca | 288 |

Asn Leu Ser Ile Ile Asp Val Gly Trp Ala Pro Leu Ala Thr Ile Thr
85 90 95

tgg gga tca cca tat acg ctt tac ttc tta tta atc atg ctt att gtc 336
Trp Gly Ser Pro Tyr Thr Leu Tyr Phe Leu Leu Ile Met Leu Ile Val
100 105 110

aat att gtt atg att gtt atg aaa aaa aaa cgg ata cct tag 378
Asn Ile Val Met Ile Val Met Lys Lys Lys Arg Ile Pro
115 120 125

<210> 13

<211> 125

<212> PRT

<213> Streptococcus agalactiae

<400> 13

Met Gln Val Phe Leu Asn Ile Val Asn Lys Phe Phe Asp Pro Val Ile
1 5 10 15

His Met Gly Ser Gly Val Val Met Leu Ile Val Met Thr Gly Leu Ala
20 25 30

Met Ile Phe Gly Val Lys Phe Ser Lys Ala Leu Glu Gly Gly Ile Lys
35 40 45

Leu Ala Ile Ala Leu Thr Gly Ile Gly Ala Ile Ile Gly Ile Leu Thr
50 55 60

Gly Ala Phe Ser Glu Ser Leu Gln Ala Phe Val Lys Asn Thr Gly Ile
65 70 75 80

Asn Leu Ser Ile Ile Asp Val Gly Trp Ala Pro Leu Ala Thr Ile Thr
85 90 95

Trp Gly Ser Pro Tyr Thr Leu Tyr Phe Leu Leu Ile Met Leu Ile Val
100 105 110

Asn Ile Val Met Ile Val Met Lys Lys Lys Arg Ile Pro
 115 120 125

<210> 14

<211> 705

<212> DNA

<213> Streptococcus agalactiae

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<222> (118)..(705)

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 acatattgcc aaagttttga tattattact ataatatagt ttgtagagga gaataat 117
 atg ggc caa gaa cct atc atc gaa tat caa aat atc aat aaa gtg tat 165
 Met Gly Gln Glu Pro Ile Ile Glu Tyr Gln Asn Ile Asn Lys Val Tyr
 1 5 10 15
 ggg gaa aat gtt gcg gtt gaa gat att aac ctt aaa att tac cct ggt 213
 Gly Glu Asn Val Ala Val Glu Asp Ile Asn Leu Lys Ile Tyr Pro Gly
 20 25 30
 gat ttc gtt tgt ttc atc ggt acg agt gga tca ggt aaa aca aca tta 261
 Asp Phe Val Cys Phe Ile Gly Thr Ser Gly Ser Gly Lys Thr Thr Leu
 35 40 45
 atg cgt atg gtt aac cat atg tta aaa cca aca aat ggt act cta tta 309
 Met Arg Met Val Asn His Met Leu Lys Pro Thr Asn Gly Thr Leu Leu
 50 55 60
 ttt aag gga aaa gat atc tct act att aac ccc att gaa tta aga cgc 357
 Phe Lys Gly Lys Asp Ile Ser Thr Ile Asn Pro Ile Glu Leu Arg Arg
 65 70 75 80
 aga att gga tat gtt atc caa aac att ggt tta atg cct cat atg acc 405

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Ile | Gly | Tyr | Val | Ile | Gln | Asn | Ile | Gly | Leu | Met | Pro | His | Met | Thr | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| att | tac | gaa | aat | ata | gtt | ctt | gta | cca | aaa | tta | ttg | aaa | tgg | tca | gaa | 453 |
| Ile | Tyr | Glu | Asn | Ile | Val | Leu | Val | Pro | Lys | Leu | Leu | Lys | Trp | Ser | Glu | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| gaa | gct | aaa | aga | gct | aaa | gca | agg | gaa | ctt | att | aaa | tta | gtt | gaa | tta | 501 |
| Glu | Ala | Lys | Arg | Ala | Lys | Ala | Arg | Glu | Leu | Ile | Lys | Leu | Val | Glu | Leu | |
| | | | 115 | | | | 120 | | | | | 125 | | | | |
| ccc | gaa | gaa | tat | ttg | gat | cgc | tac | cct | agt | gag | ttg | tct | ggc | ggg | cag | 549 |
| Pro | Glu | Glu | Tyr | Leu | Asp | Arg | Tyr | Pro | Ser | Glu | Leu | Ser | Gly | Gly | Gln | |
| | | | 130 | | | 135 | | | | | 140 | | | | | |
| caa | caa | cgt | atc | ggg | gtc | att | cgc | gct | ctt | gca | gca | gac | caa | gat | att | 597 |
| Gln | Gln | Arg | Ile | Gly | Val | Ile | Arg | Ala | Leu | Ala | Ala | Asp | Gln | Asp | Ile | |
| | | | 145 | | 150 | | | | 155 | | | | | | 160 | |
| att | tta | atg | gat | gag | cct | ttt | gga | gct | ctg | gat | cct | att | act | aga | gaa | 645 |
| Ile | Leu | Met | Asp | Glu | Pro | Phe | Gly | Ala | Leu | Asp | Pro | Ile | Thr | Arg | Glu | |
| | | | 165 | | | | | 170 | | | | | | 175 | | |
| ggg | att | caa | gac | ttt | agt | caa | gtc | tct | tca | gga | aga | aat | ggg | gga | aaa | 693 |
| Gly | Ile | Gln | Asp | Phe | Ser | Gln | Val | Ser | Ser | Gly | Arg | Asn | Gly | Gly | Lys | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| cta | tca | tct | tag | | | | | | | | | | | | | 705 |
| Leu | Ser | Ser | | | | | | | | | | | | | | |
| | | | 195 | | | | | | | | | | | | | |

<210> 15

<211> 195

<212> PRT

<213> Streptococcus agalactiae

<400> 15

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Gly | Gln | Glu | Pro | Ile | Ile | Glu | Tyr | Gln | Asn | Ile | Asn | Lys | Val | Tyr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Gly | Glu | Asn | Val | Ala | Val | Glu | Asp | Ile | Asn | Leu | Lys | Ile | Tyr | Pro | Gly |
| | | | 20 | | | | | 25 | | | | | 30 | | |

Asp Phe Val Cys Phe Ile Gly Thr Ser Gly Ser Gly Lys Thr Thr Leu
 35 40 45

Met Arg Met Val Asn His Met Leu Lys Pro Thr Asn Gly Thr Leu Leu
 50 55 60

Phe Lys Gly Lys Asp Ile Ser Thr Ile Asn Pro Ile Glu Leu Arg Arg
 65 70 75 80

Arg Ile Gly Tyr Val Ile Gln Asn Ile Gly Leu Met Pro His Met Thr
 85 90 95

Ile Tyr Glu Asn Ile Val Leu Val Pro Lys Leu Leu Lys Trp Ser Glu
 100 105 110

Glu Ala Lys Arg Ala Lys Ala Arg Glu Leu Ile Lys Leu Val Glu Leu
 115 120 125

Pro Glu Glu Tyr Leu Asp Arg Tyr Pro Ser Glu Leu Ser Gly Gly Gln
 130 135 140

Gln Gln Arg Ile Gly Val Ile Arg Ala Leu Ala Ala Asp Gln Asp Ile
 145 150 155 160

Ile Leu Met Asp Glu Pro Phe Gly Ala Leu Asp Pro Ile Thr Arg Glu
 165 170 175

Gly Ile Gln Asp Phe Ser Gln Val Ser Ser Gly Arg Asn Gly Gly Lys
 180 185 190

Leu Ser Ser
 195

<210> 16

<211> 367

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(366)

<223>

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atc cct tat agt gat gtt ttt gct aca gga gga ttt tta tac tat gta      48
Ile Pro Tyr Ser Asp Val Phe Ala Thr Gly Gly Phe Leu Tyr Tyr Val
1          5          10          15

acg att gct cta agt tac ctt tta ggg tct agt atc tgg tta ttt att      96
Thr Ile Ala Leu Ser Tyr Leu Leu Gly Ser Ser Ile Trp Leu Phe Ile
          20          25          30

gta cag ttt att gct tac tat gta tct gga att tat ttt tat aaa tta      144
Val Gln Phe Ile Ala Tyr Tyr Val Ser Gly Ile Tyr Phe Tyr Lys Leu
          35          40          45

gtt tat tat gtg gca caa agt gaa att gtc tcg ata ggc atg acg ttg      192
Val Tyr Tyr Val Ala Gln Ser Glu Ile Val Ser Ile Gly Met Thr Leu
          50          55          60

att ttc tat ata atg aat att gtc tta gga ttc ggt ggt atg tac cca      240
Ile Phe Tyr Ile Met Asn Ile Val Leu Gly Phe Gly Gly Met Tyr Pro
65          70          75          80

ata cag tgg gca tta cct ttt atg ctc att tcg cta tgg ttt tta att      288
Ile Gln Trp Ala Leu Pro Phe Met Leu Ile Ser Leu Trp Phe Leu Ile
          85          90          95

aaa ttt tgt gtc gat aat atc gtt gat gaa gca ttt ata ttt tat ggt      336
Lys Phe Cys Val Asp Asn Ile Val Asp Glu Ala Phe Ile Phe Tyr Gly
          100          105          110

att tta gca gca ttc tca cta ttt ata gat c      367
Ile Leu Ala Ala Phe Ser Leu Phe Ile Asp
          115          120

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<210> 17

<211> 122

<212> PRT

<213> Streptococcus agalactiae

<400> 17

Ile Pro Tyr Ser Asp Val Phe Ala Thr Gly Gly Phe Leu Tyr Tyr Val
1 5 10 15

Thr Ile Ala Leu Ser Tyr Leu Leu Gly Ser Ser Ile Trp Leu Phe Ile
20 25 30

Val Gln Phe Ile Ala Tyr Tyr Val Ser Gly Ile Tyr Phe Tyr Lys Leu
35 40 45

Val Tyr Tyr Val Ala Gln Ser Glu Ile Val Ser Ile Gly Met Thr Leu
50 55 60

Ile Phe Tyr Ile Met Asn Ile Val Leu Gly Phe Gly Gly Met Tyr Pro
65 70 75 80

Ile Gln Trp Ala Leu Pro Phe Met Leu Ile Ser Leu Trp Phe Leu Ile
85 90 95

Lys Phe Cys Val Asp Asn Ile Val Asp Glu Ala Phe Ile Phe Tyr Gly
100 105 110

Ile Leu Ala Ala Phe Ser Leu Phe Ile Asp
115 120

<210> 18

<211> 570

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(570)

<223>

<400> 18

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|---|-----|
| atg agg aaa cgt ttt tcc ttg cta aat ttt att gtt gtt act ttt att | 48 |
| Met Arg Lys Arg Phe Ser Leu Leu Asn Phe Ile Val Val Thr Phe Ile | |
| 1 5 10 15 | |
| ttc ttt ttc ttt att ctt ttt ccg ctt tta aac cat aag gga aaa gta | 96 |
| Phe Phe Phe Phe Ile Leu Phe Pro Leu Leu Asn His Lys Gly Lys Val | |
| 20 25 30 | |
| gat gct aat tct agg cag agt gtt acc tac acc aaa gaa gaa ttt ata | 144 |
| Asp Ala Asn Ser Arg Gln Ser Val Thr Tyr Thr Lys Glu Glu Phe Ile | |
| 35 40 45 | |
| caa aaa att gtg cca gat gcg caa gat cta gga aag tcg tac ggt att | 192 |
| Gln Lys Ile Val Pro Asp Ala Gln Asp Leu Gly Lys Ser Tyr Gly Ile | |
| 50 55 60 | |
| cgt cct tca ttt att att gca cag gcg gct ttg gat tct gat ttc gga | 240 |
| Arg Pro Ser Phe Ile Ile Ala Gln Ala Ala Leu Asp Ser Asp Phe Gly | |
| 65 70 75 80 | |
| gag aaa tat agc tat agt atc ata atc tgt tgg ttg ctt gca gaa cca | 288 |
| Glu Lys Tyr Ser Tyr Ser Ile Ile Ile Cys Trp Leu Leu Ala Glu Pro | |
| 85 90 95 | |
| gga acg ccc tca att acc tta aat gat agt agt aca gga aaa aaa cag | 336 |
| Gly Thr Pro Ser Ile Thr Leu Asn Asp Ser Ser Thr Gly Lys Lys Gln | |
| 100 105 110 | |
| gaa aag caa ttt act cat tat aaa tct tgg aag tat tca atg gat gat | 384 |
| Glu Lys Gln Phe Thr His Tyr Lys Ser Trp Lys Tyr Ser Met Asp Asp | |
| 115 120 125 | |
| tac ctt gct cat ata aaa tct gga gcg aca ggc aaa aaa gat tca tat | 432 |
| Tyr Leu Ala His Ile Lys Ser Gly Ala Thr Gly Lys Lys Asp Ser Tyr | |
| 130 135 140 | |
| act ata atg gtg tct gtt aaa aat cca aaa act tta gtg caa aaa tta | 480 |
| Thr Ile Met Val Ser Val Lys Asn Pro Lys Thr Leu Val Gln Lys Leu | |
| 145 150 155 160 | |
| caa gat agt ggt ttt gat aat gac aaa aag tac gct aaa aaa atg acg | 528 |
| Gln Asp Ser Gly Phe Asp Asn Asp Lys Lys Tyr Ala Lys Lys Met Thr | |
| 165 170 175 | |

gaa atc att gat ttg tat gat tta aca aga tat gat aag tga
 Glu Ile Ile Asp Leu Tyr Asp Leu Thr Arg Tyr Asp Lys
 180 185

570

<210> 19

<211> 189

<212> PRT

<213> Streptococcus agalactiae

<400> 19

Met Arg Lys Arg Phe Ser Leu Leu Asn Phe Ile Val Val Thr Phe Ile
 1 5 10 15

Phe Phe Phe Phe Ile Leu Phe Pro Leu Leu Asn His Lys Gly Lys Val
 20 25 30

Asp Ala Asn Ser Arg Gln Ser Val Thr Tyr Thr Lys Glu Glu Phe Ile
 35 40 45

Gln Lys Ile Val Pro Asp Ala Gln Asp Leu Gly Lys Ser Tyr Gly Ile
 50 55 60

Arg Pro Ser Phe Ile Ile Ala Gln Ala Ala Leu Asp Ser Asp Phe Gly
 65 70 75 80

Glu Lys Tyr Ser Tyr Ser Ile Ile Ile Cys Trp Leu Leu Ala Glu Pro
 85 90 95

Gly Thr Pro Ser Ile Thr Leu Asn Asp Ser Ser Thr Gly Lys Lys Gln
 100 105 110

Glu Lys Gln Phe Thr His Tyr Lys Ser Trp Lys Tyr Ser Met Asp Asp
 115 120 125

Tyr Leu Ala His Ile Lys Ser Gly Ala Thr Gly Lys Lys Asp Ser Tyr
 130 135 140

Thr Ile Met Val Ser Val Lys Asn Pro Lys Thr Leu Val Gln Lys Leu
 145 150 155 160

Gln Asp Ser Gly Phe Asp Asn Asp Lys Lys Tyr Ala Lys Lys Met Thr
 165 170 175

Glu Ile Ile Asp Leu Tyr Asp Leu Thr Arg Tyr Asp Lys
 180 185

<210> 20

<211> 978

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (978)

<223>

<400> 20

atg ctt gtc atc att ttg atc att gta cta gct agt ctg aca gtg acg 48
 Met Leu Val Ile Ile Leu Ile Ile Val Leu Ala Ser Leu Thr Val Thr
 1 5 10 15

ata att tct tac cca aaa atg acg gaa tta aca aag tcc gtt gaa aaa 96
 Ile Ile Ser Tyr Pro Lys Met Thr Glu Leu Thr Lys Ser Val Glu Lys
 20 25 30

caa ctt gaa gat aat gct gat aat cta tca gac caa ctg aca tat cag 144
 Gln Leu Glu Asp Asn Ala Asp Asn Leu Ser Asp Gln Leu Thr Tyr Gln
 35 40 45

ata gaa gtg gcg caa aaa gat caa atc tac gtg act aat cag cta aac 192
 Ile Glu Val Ala Gln Lys Asp Gln Ile Tyr Val Thr Asn Gln Leu Asn
 50 55 60

cgt atg caa cag gaa att atc agt cgc tta ccg ata tgc gta cag aat 240

G:\SH-APPS\Seq\gje-70.wpd\DNB\srp

aat aag tac tta aat cct cct gaa acg aca aat ttt ggt atc atg ttc 864
 Asn Lys Tyr Leu Asn Pro Pro Glu Thr Thr Asn Phe Gly Ile Met Phe
 275 280 285

 tta cca act gaa ggg ctc tat tct gaa gtg gta aga aat gca aca ttc 912
 Leu Pro Thr Glu Gly Leu Tyr Ser Glu Val Val Arg Asn Ala Thr Phe
 290 295 300

 ttt gat agt cta aga cgt gac gaa aat att gta gta gct gga ccg tca 960
 Phe Asp Ser Leu Arg Arg Asp Glu Asn Ile Val Val Ala Gly Pro Ser
 305 310 315 320

 acc tta tct gct tac taa 978
 Thr Leu Ser Ala Tyr
 325

<210> 21

<211> 325

<212> PRT

<213> Streptococcus agalactiae

<400> 21

Met Leu Val Ile Ile Leu Ile Ile Val Leu Ala Ser Leu Thr Val Thr
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 Ile Ile Ser Tyr Pro Lys Met Thr Glu Leu Thr Lys Ser Val Glu Lys
 20 25 30

 Gln Leu Glu Asp Asn Ala Asp Asn Leu Ser Asp Gln Leu Thr Tyr Gln
 35 40 45

 Ile Glu Val Ala Gln Lys Asp Gln Ile Tyr Val Thr Asn Gln Leu Asn
 50 55 60

 Arg Met Gln Gln Glu Ile Ile Ser Arg Leu Pro Ile Cys Val Gln Asn
 65 70 75 80

 Lys Ser Ala Leu Thr Glu Ser Arg Asp Arg Ser Asp Lys Arg Leu Glu
 85 90 95

Leu Ile Asn Ser Asn Leu Ser Gln Ser Val Gln Lys Met Gln Asp Ser
 100 105 110

Met Lys Asn Ala Trp Ile Lys Cys Ala Lys Leu Leu Arg Lys Ser Trp
 115 120 125

Lys Lys Arg Tyr Lys Arg Val Ala Asn Phe Phe Glu Thr Val Ser Arg
 130 135 140

Gln Leu Glu Ser Val Asn Gln Gly Leu Gly Arg Trp Lys Leu Cys Gln
 145 150 155 160

Asp Val Gly Thr Thr Glu Gln Ser Leu Ser Asn Thr Lys Thr Arg Gly
 165 170 175

Ile Leu Gly Glu Leu Gln Leu Gly Gln Ile Ile Glu Asp Ile Met Thr
 180 185 190

Val Ser Gln Tyr Glu Arg Glu Phe Pro Thr Val Ser Gly Ser Ser Glu
 195 200 205

Arg Val Glu Tyr Ala Ile Lys Tyr Leu Glu Met Val Arg Glu Ile Ile
 210 215 220

Ser Ile Cys Leu Leu Thr Leu Ser Phe Ser Arg Arg Leu Leu Pro Ile
 225 230 235 240

Gly Arg Cys Leu Trp Asn Trp Val Thr Arg Phe Lys Trp Asn Ser Ile
 245 250 255

Arg Asn Leu Tyr Trp Ala Ser Ile Arg Lys Phe Ala Lys Asp Ile Asn
 260 265 270

Asn Lys Tyr Leu Asn Pro Pro Glu Thr Thr Asn Phe Gly Ile Met Phe
 275 280 285

Leu Pro Thr Glu Gly Leu Tyr Ser Glu Val Val Arg Asn Ala Thr Phe
 290 295 300

Phe Asp Ser Leu Arg Arg Asp Glu Asn Ile Val Val Ala Gly Pro Ser
 305 310 315 320

Thr Leu Ser Ala Tyr
 325

<210> 22

<211> 579

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (579)

<223>

<400> 22

atg cga aaa gaa gtg aca cca gag atg ctt aac tat aat aag tat cct 48
 Met Arg Lys Glu Val Thr Pro Glu Met Leu Asn Tyr Asn Lys Tyr Pro
 1 5 10 15

ggc cca cag ttt att cac ttt gaa aat atc gtt aaa agt gat gat att 96
 Gly Pro Gln Phe Ile His Phe Glu Asn Ile Val Lys Ser Asp Asp Ile
 20 25 30

gaa ttt caa ctt gtt att aat gaa aaa tca gct ttt gat gtg act gtc 144
 Glu Phe Gln Leu Val Ile Asn Glu Lys Ser Ala Phe Asp Val Thr Val
 35 40 45

ttt gga caa cgt ttt tct gag att tta tta aaa tat gat ttt atc gtt 192
 Phe Gly Gln Arg Phe Ser Glu Ile Leu Leu Lys Tyr Asp Phe Ile Val
 50 55 60

ggc gat tgg ggt aac gag cag ttg agg cta aga ggc ttt tac aaa gat 240
 Gly Asp Trp Gly Asn Glu Gln Leu Arg Leu Arg Gly Phe Tyr Lys Asp
 65 70 75 80

gct agt acg att aga aaa aat agc cgg att tca cgt tta gaa gat tat 288

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Ala | Ser | Thr | Ile | Arg | Lys | Asn | Ser | Arg | Ile | Ser | Arg | Leu | Glu | Asp | Tyr | | |
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| att | aaa | gag | tat | tgt | aac | ttt | ggt | tgt | gct | tat | ttt | gtg | ttg | gag | aat | 336 | |
| Ile | Lys | Glu | Tyr | Cys | Asn | Phe | Gly | Cys | Ala | Tyr | Phe | Val | Leu | Glu | Asn | | |
| | | | 100 | | | | 105 | | | | | 110 | | | | | |
| cca | aat | cct | aga | gat | att | aaa | ttt | gat | gat | gaa | aga | cct | cat | aag | cgt | 384 | |
| Pro | Asn | Pro | Arg | Asp | Ile | Lys | Phe | Asp | Asp | Glu | Arg | Pro | His | Lys | Arg | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| cgt | aag | tca | aga | tcc | aaa | tca | caa | tca | tca | aag | tca | caa | act | aga | aat | 432 | |
| Arg | Lys | Ser | Arg | Ser | Lys | Ser | Gln | Ser | Ser | Lys | Ser | Gln | Thr | Arg | Asn | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| aat | cgt | tcc | cag | tca | aat | gcc | aat | gct | cat | ttt | aca | agt | aaa | aag | cgt | 480 | |
| Asn | Arg | Ser | Gln | Ser | Asn | Ala | Asn | Ala | His | Phe | Thr | Ser | Lys | Lys | Arg | | |
| 145 | | | | | 150 | | | | 155 | | | | | | 160 | | |
| aaa | gac | aca | aaa | cgc | cgt | caa | gaa | cgt | cat | att | aaa | gaa | gag | caa | gat | 528 | |
| Lys | Asp | Thr | Lys | Arg | Arg | Gln | Glu | Arg | His | Ile | Lys | Glu | Glu | Gln | Asp | | |
| | | | 165 | | | | | | 170 | | | | | 175 | | | |
| aag | gaa | atg | acc | tct | gca | aag | cag | cat | ttg | tta | ttc | gta | aga | aaa | aat | 576 | |
| Lys | Glu | Met | Thr | Ser | Ala | Lys | Gln | His | Leu | Leu | Phe | Val | Arg | Lys | Asn | | |
| | | | 180 | | | | 185 | | | | | 190 | | | | | |
| taa | | | | | | | | | | | | | | | | 579 | |

<210> 23

<211> 192

<212> PRT

<213> Streptococcus agalactiae

<400> 23

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| Met | Arg | Lys | Glu | Val | Thr | Pro | Glu | Met | Leu | Asn | Tyr | Asn | Lys | Tyr | Pro | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | |
| Gly | Pro | Gln | Phe | Ile | His | Phe | Glu | Asn | Ile | Val | Lys | Ser | Asp | Asp | Ile | | |
| | | | 20 | | | | | 25 | | | | | 30 | | | | |

Glu Phe Gln Leu Val Ile Asn Glu Lys Ser Ala Phe Asp Val Thr Val
 35 40 45

Phe Gly Gln Arg Phe Ser Glu Ile Leu Leu Lys Tyr Asp Phe Ile Val
 50 55 60

Gly Asp Trp Gly Asn Glu Gln Leu Arg Leu Arg Gly Phe Tyr Lys Asp
 65 70 75 80

Ala Ser Thr Ile Arg Lys Asn Ser Arg Ile Ser Arg Leu Glu Asp Tyr
 85 90 95

Ile Lys Glu Tyr Cys Asn Phe Gly Cys Ala Tyr Phe Val Leu Glu Asn
 100 105 110

Pro Asn Pro Arg Asp Ile Lys Phe Asp Asp Glu Arg Pro His Lys Arg
 115 120 125

Arg Lys Ser Arg Ser Lys Ser Gln Ser Ser Lys Ser Gln Thr Arg Asn
 130 135 140

Asn Arg Ser Gln Ser Asn Ala Asn Ala His Phe Thr Ser Lys Lys Arg
 145 150 155 160

Lys Asp Thr Lys Arg Arg Gln Glu Arg His Ile Lys Glu Glu Gln Asp
 165 170 175

Lys Glu Met Thr Ser Ala Lys Gln His Leu Leu Phe Val Arg Lys Asn
 180 185 190

<210> 24

<211> 609

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(609)

<223>

<400> 24

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| atg | aca | ata | aaa | aaa | gtg | tta | agt | gta | aca | gga | att | att | tta | gtg | aca | 48 |
| Met | Thr | Ile | Lys | Lys | Val | Leu | Ser | Val | Thr | Gly | Ile | Ile | Leu | Val | Thr | |
| 1 | | | 5 | | | | | | 10 | | | | | 15 | | |
| | | | | | | | | | | | | | | | | |
| gta | gcg | tct | cta | gct | gct | tgt | agc | tca | aaa | tct | cat | act | act | aag | acg | 96 |
| Val | Ala | Ser | Leu | Ala | Ala | Cys | Ser | Ser | Lys | Ser | His | Thr | Thr | Lys | Thr | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| | | | | | | | | | | | | | | | | |
| ggc | aaa | aaa | gaa | ggt | aat | ttt | gca | act | ggt | gga | aca | acg | gca | cct | ttt | 144 |
| Gly | Lys | Lys | Glu | Val | Asn | Phe | Ala | Thr | Val | Gly | Thr | Thr | Ala | Pro | Phe | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |
| | | | | | | | | | | | | | | | | |
| tct | tat | gtg | aag | gat | ggg | aaa | ctg | act | ggc | ttt | gat | att | gaa | gta | gcc | 192 |
| Ser | Tyr | Val | Lys | Asp | Gly | Lys | Leu | Thr | Gly | Phe | Asp | Ile | Glu | Val | Ala | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| | | | | | | | | | | | | | | | | |
| aaa | gct | ggt | ttt | aaa | ggg | tca | gat | aac | tat | aaa | gtc | act | ttt | aaa | aaa | 240 |
| Lys | Ala | Val | Phe | Lys | Gly | Ser | Asp | Asn | Tyr | Lys | Val | Thr | Phe | Lys | Lys | |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 | |
| | | | | | | | | | | | | | | | | |
| aca | gaa | tgg | tca | tcg | gta | ttt | acc | ggc | att | gat | tca | gga | aag | ttt | caa | 288 |
| Thr | Glu | Trp | Ser | Ser | Val | Phe | Thr | Gly | Ile | Asp | Ser | Gly | Lys | Phe | Gln | |
| | | | | 85 | | | | | 90 | | | | | 95 | | |
| | | | | | | | | | | | | | | | | |
| atg | ggg | gga | aat | aat | att | tct | tat | tca | tca | gag | aga | tct | caa | aaa | tay | 336 |
| Met | Gly | Gly | Asn | Asn | Ile | Ser | Tyr | Ser | Ser | Glu | Arg | Ser | Gln | Lys | Tyr | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| | | | | | | | | | | | | | | | | |
| tta | ttt | tca | tac | cca | ata | ggc | tct | act | cct | tca | ggt | tta | gca | ggt | cct | 384 |
| Leu | Phe | Ser | Tyr | Pro | Ile | Gly | Ser | Thr | Pro | Ser | Val | Leu | Ala | Val | Pro | |
| | | 115 | | | | | 120 | | | | | 125 | | | | |
| | | | | | | | | | | | | | | | | |
| aag | aat | agt | aat | atc | aaa | gct | tat | aat | gat | att | agt | ggg | cat | aaa | aca | 432 |
| Lys | Asn | Ser | Asn | Ile | Lys | Ala | Tyr | Asn | Asp | Ile | Ser | Gly | His | Lys | Thr | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| | | | | | | | | | | | | | | | | |
| cag | ggt | gtc | caa | gga | acg | aca | act | gcc | aag | caa | tta | gaa | aat | ttc | aat | 480 |
| Gln | Val | Val | Gln | Gly | Thr | Thr | Ala | Lys | Gln | Leu | Glu | Asn | Phe | Asn | | |
| 145 | | | | | 150 | | | | 155 | | | | | 160 | | |
| | | | | | | | | | | | | | | | | |
| aaa | gag | cat | cag | aaa | aat | cct | ggt | act | cta | aaa | tat | act | aat | gaa | aat | 528 |

Lys Glu His Gln Lys Asn Pro Val Thr Leu Lys Tyr Thr Asn Glu Asn
 165 170 175

att aca cag att cta acg aat ttg agt gat gga aaa gct gat ttt aaa 576
 Ile Thr Gln Ile Leu Thr Asn Leu Ser Asp Gly Lys Ala Asp Phe Lys
 180 185 190

ctt ttg acg gac caa ctg tta acg cta tta taa 609
 Leu Leu Thr Asp Gln Leu Leu Thr Leu Leu
 195 200

<210> 25

<211> 202

<212> PRT

<213> Streptococcus agalactiae

<400> 25

Met Thr Ile Lys Lys Val Leu Ser Val Thr Gly Ile Ile Leu Val Thr
 1 5 10 15

Val Ala Ser Leu Ala Ala Cys Ser Ser Lys Ser His Thr Thr Lys Thr
 20 25 30

Gly Lys Lys Glu Val Asn Phe Ala Thr Val Gly Thr Thr Ala Pro Phe
 35 40 45

Ser Tyr Val Lys Asp Gly Lys Leu Thr Gly Phe Asp Ile Glu Val Ala
 50 55 60

Lys Ala Val Phe Lys Gly Ser Asp Asn Tyr Lys Val Thr Phe Lys Lys
 65 70 75 80

Thr Glu Trp Ser Ser Val Phe Thr Gly Ile Asp Ser Gly Lys Phe Gln
 85 90 95

Met Gly Gly Asn Asn Ile Ser Tyr Ser Ser Glu Arg Ser Gln Lys Tyr
 100 105 110

Leu Phe Ser Tyr Pro Ile Gly Ser Thr Pro Ser Val Leu Ala Val Pro
 115 120 125

Lys Asn Ser Asn Ile Lys Ala Tyr Asn Asp Ile Ser Gly His Lys Thr
 130 135 140

Gln Val Val Gln Gly Thr Thr Thr Ala Lys Gln Leu Glu Asn Phe Asn
 145 150 155 160

Lys Glu His Gln Lys Asn Pro Val Thr Leu Lys Tyr Thr Asn Glu Asn
 165 170 175

Ile Thr Gln Ile Leu Thr Asn Leu Ser Asp Gly Lys Ala Asp Phe Lys
 180 185 190

Leu Leu Thr Asp Gln Leu Leu Thr Leu Leu
 195 200

<210> 26

<211> 357

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (357)

<223>

<400> 26

atg aag aat ata aca aag cta tca act gtt gct tta agc cta cta ctt 48
 Met Lys Asn Ile Thr Lys Leu Ser Thr Val Ala Leu Ser Leu Leu Leu
 1 5 10 15

tgt acg gcg tgt gct gca tca aac acg tct aca tct aaa aca cag tct 96

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Thr | Ala | Cys | Ala | Ala | Ser | Asn | Thr | Ser | Thr | Ser | Lys | Thr | Gln | Ser | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| cat | cat | cct | aaa | caa | act | aaa | ctc | aca | gat | aag | caa | aaa | gaa | gaa | ccc | 144 |
| His | His | Pro | Lys | Gln | Thr | Lys | Leu | Thr | Asp | Lys | Gln | Lys | Glu | Glu | Pro | |
| | | 35 | | | | | 40 | | | | 45 | | | | | |
| aaa | aac | aaa | gaa | gct | gct | gat | caa | gag | atg | cat | ccc | caa | ggc | gct | ggt | 192 |
| Lys | Asn | Lys | Glu | Ala | Ala | Asp | Gln | Glu | Met | His | Pro | Gln | Gly | Ala | Val | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |
| gat | ttg | aca | aaa | tat | aag | gca | aaa | ccg | gtc | aaa | gat | tat | gga | aaa | aaa | 240 |
| Asp | Leu | Thr | Lys | Tyr | Lys | Ala | Lys | Pro | Val | Lys | Asp | Tyr | Gly | Lys | Lys | |
| | 65 | | | | 70 | | | | | 75 | | | | | 80 | |
| atc | gat | gtt | ggt | gat | ggc | aag | aaa | atg | aac | att | tat | gaa | act | ggt | cag | 288 |
| Ile | Asp | Val | Gly | Asp | Gly | Lys | Lys | Met | Asn | Ile | Tyr | Glu | Thr | Gly | Gln | |
| | | | 85 | | | | | 90 | | | | | | 95 | | |
| gga | aaa | att | cca | att | gtt | ttt | att | cct | ggt | caa | gct | gag | att | cgc | cac | 336 |
| Gly | Lys | Ile | Pro | Ile | Val | Phe | Ile | Pro | Gly | Gln | Ala | Glu | Ile | Arg | His | |
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| gct | atg | ctt | ata | aga | att | taa | | | | | | | | | | 357 |
| Ala | Met | Leu | Ile | Arg | Ile | | | | | | | | | | | |
| | | | 115 | | | | | | | | | | | | | |

<210> 27

<211> 118

<212> PRT

<213> Streptococcus agalactiae

<400> 27

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Met | Lys | Asn | Ile | Thr | Lys | Leu | Ser | Thr | Val | Ala | Leu | Ser | Leu | Leu | Leu | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Cys | Thr | Ala | Cys | Ala | Ala | Ser | Asn | Thr | Ser | Thr | Ser | Lys | Thr | Gln | Ser | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| His | His | Pro | Lys | Gln | Thr | Lys | Leu | Thr | Asp | Lys | Gln | Lys | Glu | Glu | Pro | |
| | | 35 | | | | | 40 | | | | 45 | | | | | |

Lys Asn Lys Glu Ala Ala Asp Gln Glu Met His Pro Gln Gly Ala Val
 50 55 60

Asp Leu Thr Lys Tyr Lys Ala Lys Pro Val Lys Asp Tyr Gly Lys Lys
 65 70 75 80

Ile Asp Val Gly Asp Gly Lys Lys Met Asn Ile Tyr Glu Thr Gly Gln
 85 90 95

Gly Lys Ile Pro Ile Val Phe Ile Pro Gly Gln Ala Glu Ile Arg His
 100 105 110

Ala Met Leu Ile Arg Ile
 115

<210> 28

<211> 1191

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1)..(1191)

<223>

<400> 28
 gtg aat gaa tcg acc atc aga aaa gaa ttt aaa ata gtt gtt ttt aaa 48
 Val Asn Glu Ser Thr Ile Arg Lys Glu Phe Lys Ile Val Val Phe Lys
 1 5 10 15

tgg atc tta aat aat caa gca gtt att gct ctc atg att acc ttt ttg 96
 Trp Ile Leu Asn Asn Gln Ala Val Ile Ala Leu Met Ile Thr Phe Leu
 20 25 30

gta ttt tta acg att ttt att ttt acc aaa atc tct ttt atg ttt aaa 144

| | |
|---|-----|
| Val Phe Leu Thr Ile Phe Ile Phe Thr Lys Ile Ser Phe Met Phe Lys | |
| 35 40 45 | |
| cct gtg ttt gat ttt ctt gct gtg ctg ata ttg ccg ctt gta att tct | 192 |
| Pro Val Phe Asp Phe Leu Ala Val Leu Ile Leu Pro Leu Val Ile Ser | |
| 50 55 60 | |
| ggc ttg ctt tat tac cta tta aaa cct atg gtt aca ttt tta gag aag | 240 |
| Gly Leu Leu Tyr Tyr Leu Leu Lys Pro Met Val Thr Phe Leu Glu Lys | |
| 65 70 75 80 | |
| cgg gga att aag cgt gta aca gcg ata tta tca gtt ttt act att ata | 288 |
| Arg Gly Ile Lys Arg Val Thr Ala Ile Leu Ser Val Phe Thr Ile Ile | |
| 85 90 95 | |
| atc ctt ctg tta att tgg gca atg tct agt ttt att ccc atg atg agt | 336 |
| Ile Leu Leu Leu Ile Trp Ala Met Ser Ser Phe Ile Pro Met Met Ser | |
| 100 105 110 | |
| aat caa tta cgc cat ttt atg gaa gat ctc cct tca tat gtg aat aaa | 384 |
| Asn Gln Leu Arg His Phe Met Glu Asp Leu Pro Ser Tyr Val Asn Lys | |
| 115 120 125 | |
| gtg caa atg gaa aca agt tcg ttt ata gat cac aac cct tgg tta aaa | 432 |
| Val Gln Met Glu Thr Ser Ser Phe Ile Asp His Asn Pro Trp Leu Lys | |
| 130 135 140 | |
| tct tat aaa ggg gaa ata tcg agc atg tta tct aat atc agt agc caa | 480 |
| Ser Tyr Lys Gly Glu Ile Ser Ser Met Leu Ser Asn Ile Ser Ser Gln | |
| 145 150 155 160 | |
| gcg gtc tct tat gct gaa aaa ttt tca aag aat gtt tta gat tgg gca | 528 |
| Ala Val Ser Tyr Ala Glu Lys Phe Ser Lys Asn Val Leu Asp Trp Ala | |
| 165 170 175 | |
| gga aat tta gct agt aca gtt gca cgt gtg aca gta gca aca atc atg | 576 |
| Gly Asn Leu Ala Ser Thr Val Ala Arg Val Thr Val Ala Thr Ile Met | |
| 180 185 190 | |
| gct ccc ttt att ttg ttt tat ctt tta aga gat agt cgc aac atg aag | 624 |
| Ala Pro Phe Ile Leu Phe Tyr Leu Leu Arg Asp Ser Arg Asn Met Lys | |
| 195 200 205 | |
| aat ggt ttc tta atg gtt tta cca acc aaa cta cgc caa cca gct gat | 672 |
| Asn Gly Phe Leu Met Val Leu Pro Thr Lys Leu Arg Gln Pro Ala Asp | |
| 210 215 220 | |
| cgt att ttg cga gaa atg aat agt caa atg tca gga tat gtg caa gga | 720 |
| Arg Ile Leu Arg Glu Met Asn Ser Gln Met Ser Gly Tyr Val Gln Gly | |
| 225 230 235 240 | |

| | |
|---|------|
| caa atc att gtt gct att act gtt ggt gtt att ttt tca ata atg tat | 768 |
| Gln Ile Ile Val Ala Ile Thr Val Gly Val Ile Phe Ser Ile Met Tyr | |
| 245 250 255 | |
| agt att ata ggc ctt aga tat ggc gtg aca tta ggg att att gcc ggt | 816 |
| Ser Ile Ile Gly Leu Arg Tyr Gly Val Thr Leu Gly Ile Ile Ala Gly | |
| 260 265 270 | |
| gtg tta aat atg gtt ccc tat ttg gga agt ttt gtc gcc caa att cca | 864 |
| Val Leu Asn Met Val Pro Tyr Leu Gly Ser Phe Val Ala Gln Ile Pro | |
| 275 280 285 | |
| gtg ttt atc tta gcg ctt gtc gca gga cct gtt atg gtt gtt aaa gtt | 912 |
| Val Phe Ile Leu Ala Leu Val Ala Gly Pro Val Met Val Val Lys Val | |
| 290 295 300 | |
| gcg att gtt ttt gtt att gag caa act cta gag gga cgc ttt gtc tca | 960 |
| Ala Ile Val Phe Val Ile Glu Gln Thr Leu Glu Gly Arg Phe Val Ser | |
| 305 310 315 320 | |
| cct ttg gtt tta ggt aat aaa ctt agc att cat cca att aca att atg | 1008 |
| Pro Leu Val Leu Gly Asn Lys Leu Ser Ile His Pro Ile Thr Ile Met | |
| 325 330 335 | |
| ttt att tta tta acc tct gga gcg atg ttt ggt gtt tgg gga gta ttc | 1056 |
| Phe Ile Leu Leu Thr Ser Gly Ala Met Phe Gly Val Trp Gly Val Phe | |
| 340 345 350 | |
| ctc agt att ccg att tat gca tct atc aaa gtt gtt gtt aaa gaa ttg | 1104 |
| Leu Ser Ile Pro Ile Tyr Ala Ser Ile Lys Val Val Val Lys Glu Leu | |
| 355 360 365 | |
| ttt gat tgg tac aaa gct gtc agt ggg cta tat aca ata gat gtt gtt | 1152 |
| Phe Asp Trp Tyr Lys Ala Val Ser Gly Leu Tyr Thr Ile Asp Val Val | |
| 370 375 380 | |
| act gaa gaa aga agt gaa gaa gtt aaa aat gtt gaa tag | 1191 |
| Thr Glu Glu Arg Ser Glu Glu Val Lys Asn Val Glu | |
| 385 390 395 | |

<210> 29

<211> 396

<212> PRT

<213> Streptococcus agalactiae

<400> 29

Val Asn Glu Ser Thr Ile Arg Lys Glu Phe Lys Ile Val Val Phe Lys
1 5 10 15

Trp Ile Leu Asn Asn Gln Ala Val Ile Ala Leu Met Ile Thr Phe Leu
20 25 30

Val Phe Leu Thr Ile Phe Ile Phe Thr Lys Ile Ser Phe Met Phe Lys
35 40 45

Pro Val Phe Asp Phe Leu Ala Val Leu Ile Leu Pro Leu Val Ile Ser
50 55 60

Gly Leu Leu Tyr Tyr Leu Leu Lys Pro Met Val Thr Phe Leu Glu Lys
65 70 75 80

Arg Gly Ile Lys Arg Val Thr Ala Ile Leu Ser Val Phe Thr Ile Ile
85 90 95

Ile Leu Leu Leu Ile Trp Ala Met Ser Ser Phe Ile Pro Met Met Ser
100 105 110

Asn Gln Leu Arg His Phe Met Glu Asp Leu Pro Ser Tyr Val Asn Lys
115 120 125

Val Gln Met Glu Thr Ser Ser Phe Ile Asp His Asn Pro Trp Leu Lys
130 135 140

Ser Tyr Lys Gly Glu Ile Ser Ser Met Leu Ser Asn Ile Ser Ser Gln
145 150 155 160

Ala Val Ser Tyr Ala Glu Lys Phe Ser Lys Asn Val Leu Asp Trp Ala
165 170 175

Gly Asn Leu Ala Ser Thr Val Ala Arg Val Thr Val Ala Thr Ile Met
180 185 190

Ala Pro Phe Ile Leu Phe Tyr Leu Leu Arg Asp Ser Arg Asn Met Lys
 195 200 205

Asn Gly Phe Leu Met Val Leu Pro Thr Lys Leu Arg Gln Pro Ala Asp
 210 215 220

Arg Ile Leu Arg Glu Met Asn Ser Gln Met Ser Gly Tyr Val Gln Gly
 225 230 235 240

Gln Ile Ile Val Ala Ile Thr Val Gly Val Ile Phe Ser Ile Met Tyr
 245 250 255

Ser Ile Ile Gly Leu Arg Tyr Gly Val Thr Leu Gly Ile Ile Ala Gly
 260 265 270

Val Leu Asn Met Val Pro Tyr Leu Gly Ser Phe Val Ala Gln Ile Pro
 275 280 285

Val Phe Ile Leu Ala Leu Val Ala Gly Pro Val Met Val Val Lys Val
 290 295 300

Ala Ile Val Phe Val Ile Glu Gln Thr Leu Glu Gly Arg Phe Val Ser
 305 310 315 320

Pro Leu Val Leu Gly Asn Lys Leu Ser Ile His Pro Ile Thr Ile Met
 325 330 335

Phe Ile Leu Leu Thr Ser Gly Ala Met Phe Gly Val Trp Gly Val Phe
 340 345 350

Leu Ser Ile Pro Ile Tyr Ala Ser Ile Lys Val Val Val Lys Glu Leu
 355 360 365

Phe Asp Trp Tyr Lys Ala Val Ser Gly Leu Tyr Thr Ile Asp Val Val
 370 375 380

Thr Glu Glu Arg Ser Glu Glu Val Lys Asn Val Glu
 385 390 395

<210> 30

<211> 1230

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (1230)

<223>

<220>

<221> misc_feature

<222> (357) .. (357)

<223> The 'Xaa' at location 357 stands for Thr, or Ile.

<400> 30

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| atg | ttt | atg | gga | atc | cca | caa | tat | ttc | ttc | tac | ctt | atc | tta | gct | gtc | 48 |
| Met | Phe | Met | Gly | Ile | Pro | Gln | Tyr | Phe | Phe | Tyr | Leu | Ile | Leu | Ala | Val | |
| 1 | | | 5 | | | | | 10 | | | | | 15 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| cta | cca | att | tac | atc | ggc | tta | ttc | ttt | aag | aag | cgt | ttt | gcc | tta | tat | 96 |
| Leu | Pro | Ile | Tyr | Ile | Gly | Leu | Phe | Phe | Lys | Lys | Arg | Phe | Ala | Leu | Tyr | |
| | | 20 | | | | | 25 | | | | | 30 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gag | att | att | ttt | agt | cta | agt | ttt | att | gta | atg | atg | ttg | act | ggt | agt | 144 |
| Glu | Ile | Ile | Phe | Ser | Leu | Ser | Phe | Ile | Val | Met | Met | Leu | Thr | Gly | Ser | |
| | 35 | | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| act | ttt | aat | caa | ttg | aag | tca | cta | ttg | gca | tac | gtt | gtc | gga | cag | tct | 192 |
| Thr | Phe | Asn | Gln | Leu | Lys | Ser | Leu | Leu | Ala | Tyr | Val | Val | Gly | Gln | Ser | |
| | 50 | | | | | 55 | | | | 60 | | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ctg | cta | gtt | ttt | atc | tat | aaa | gct | tac | cgg | aaa | cga | ttt | aat | cat | act | 240 |
| Leu | Leu | Val | Phe | Ile | Tyr | Lys | Ala | Tyr | Arg | Lys | Arg | Phe | Asn | His | Thr | |
| 65 | | | | 70 | | | | 75 | | | | 80 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttg | gtc | ttt | tat | gta | acg | gtt | tgt | tta | tct | att | ttt | ccg | cta | ttt | ttg | 288 |
| Leu | Val | Phe | Tyr | Val | Thr | Val | Cys | Leu | Ser | Ile | Phe | Pro | Leu | Phe | Leu | |
| | | | 85 | | | | | 90 | | | | | 95 | | | |

| | |
|---|-----|
| gta aaa tta att cca gct ata tct gag gat ggg cat cag tca ctt ttt Val Lys Leu Ile Pro Ala Ile Ser Glu Asp Gly His Gln Ser Leu Phe 100 105 110 | 336 |
| ggg ttt cta gga att tct tac ctt act ttt aga gct gtt gct atg att Gly Phe Leu Gly Ile Ser Tyr Leu Thr Phe Arg Ala Val Ala Met Ile 115 120 125 | 384 |
| att gaa atg aga gac ggt gtc ttg aaa gaa ttt act tta tgg gaa ttc Ile Glu Met Arg Asp Gly Val Leu Lys Glu Phe Thr Leu Trp Glu Phe 130 135 140 | 432 |
| tta aga ttt tta ctc ttc ttt cca act ttc tca agt gga cca att gat Leu Arg Phe Leu Leu Phe Phe Pro Thr Phe Ser Ser Gly Pro Ile Asp 145 150 155 160 | 480 |
| cgt ttt aaa cga ttc aat gag gat tac att aat atc cca gat cga aac Arg Phe Lys Arg Phe Asn Glu Asp Tyr Ile Asn Ile Pro Asp Arg Asn 165 170 175 | 528 |
| gaa ctc cta gat atg tta ggt caa gcg att cat tat ttg atg tta ggt Glu Leu Leu Asp Met Leu Gly Gln Ala Ile His Tyr Leu Met Leu Gly 180 185 190 | 576 |
| ttt ctc tat aag ttt att tta gcc tat att ttt gga agt ctg att atg Phe Leu Tyr Lys Phe Ile Leu Ala Tyr Ile Phe Gly Ser Leu Ile Met 195 200 205 | 624 |
| cct cct cta aaa gaa tta gcg cta gaa cag ggt ggt gtg ttt aat tgg Pro Pro Leu Lys Glu Leu Ala Leu Glu Gln Gly Gly Val Phe Asn Trp 210 215 220 | 672 |
| cca aca ctt ggg gtt atg tat gcc ttt ggt ttt gat ttg ttc ttt gat Pro Thr Leu Gly Val Met Tyr Ala Phe Gly Phe Asp Leu Phe Phe Asp 225 230 235 240 | 720 |
| ttt gca ggt tac aca atg ttt gcg ttg gct att tct aac cta atg ggg Phe Ala Gly Tyr Thr Met Phe Ala Leu Ala Ile Ser Asn Leu Met Gly 245 250 255 | 768 |
| att aag tct ccg att aac ttt gac aaa cct ttc aaa tca cgc gac cta Ile Lys Ser Pro Ile Asn Phe Asp Lys Pro Phe Lys Ser Arg Asp Leu 260 265 270 | 816 |
| aaa gaa ttt tgg aat aga tgg cat atg agc ctt tct ttc tgg ttt aga Lys Glu Phe Trp Asn Arg Trp His Met Ser Leu Ser Phe Trp Phe Arg 275 280 285 | 864 |
| gac ttt gtt ttc atg agg ctt gtt aag ctt tta gtt aaa aat aaa gtt Asp Phe Val Phe Met Arg Leu Val Lys Leu Leu Val Lys Asn Lys Val 290 295 300 | 912 |

ttt aaa aac cgt aat gtt act tca agt gta gct tat att atc aat atg 960
 Phe Lys Asn Arg Asn Val Thr Ser Ser Val Ala Tyr Ile Ile Asn Met
 305 310 315 320

ctt ctt atg gga ttc tgg cat ggg tta act tgg tac tat ata gcc tat 1008
 Leu Leu Met Gly Phe Trp His Gly Leu Thr Trp Tyr Tyr Ile Ala Tyr
 325 330 335

ggt ctc ttt cat ggg att ggc cta gtt att aat gac gct tgg gta cgt 1056
 Gly Leu Phe His Gly Ile Gly Leu Val Ile Asn Asp Ala Trp Val Arg
 340 345 350

aag aag aaa aat ayt aat aaa gaa aga aga ttg gct aaa aaa cca ctt 1104
 Lys Lys Lys Asn Xaa Asn Lys Glu Arg Arg Leu Ala Lys Lys Pro Leu
 355 360 365

tta cca gaa aac aaa tgg act tat gct ttg ggt gtc ttc atc acc ttt 1152
 Leu Pro Glu Asn Lys Trp Thr Tyr Ala Leu Gly Val Phe Ile Thr Phe
 370 375 380

aat gta gtt atg ttt tct ttc ttg att ttt tca gga ttt tta gat ctt 1200
 Asn Val Val Met Phe Ser Phe Leu Ile Phe Ser Gly Phe Leu Asp Leu
 385 390 395 400

ttg tgg ttc cca caa ccg cat aac aaa taa 1230
 Leu Trp Phe Pro Gln Pro His Asn Lys
 405

<210> 31

<211> 409

<212> PRT

<213> Streptococcus agalactiae

<220>

<221> misc_feature

<222> (357) .. (357)

<223> The 'Xaa' at location 357 stands for Thr, or Ile.

<400> 31

Met Phe Met Gly Ile Pro Gln Tyr Phe Phe Tyr Leu Ile Leu Ala Val
 1 5 10 15

Leu Pro Ile Tyr Ile Gly Leu Phe Phe Lys Lys Arg Phe Ala Leu Tyr
 20 25 30

Glu Ile Ile Phe Ser Leu Ser Phe Ile Val Met Met Leu Thr Gly Ser
 35 40 45

Thr Phe Asn Gln Leu Lys Ser Leu Leu Ala Tyr Val Val Gly Gln Ser
 50 55 60

Leu Leu Val Phe Ile Tyr Lys Ala Tyr Arg Lys Arg Phe Asn His Thr
 65 70 75 80

Leu Val Phe Tyr Val Thr Val Cys Leu Ser Ile Phe Pro Leu Phe Leu
 85 90 95

Val Lys Leu Ile Pro Ala Ile Ser Glu Asp Gly His Gln Ser Leu Phe
 100 105 110

Gly Phe Leu Gly Ile Ser Tyr Leu Thr Phe Arg Ala Val Ala Met Ile
 115 120 125

Ile Glu Met Arg Asp Gly Val Leu Lys Glu Phe Thr Leu Trp Glu Phe
 130 135 140

Leu Arg Phe Leu Leu Phe Phe Pro Thr Phe Ser Ser Gly Pro Ile Asp
 145 150 155 160

Arg Phe Lys Arg Phe Asn Glu Asp Tyr Ile Asn Ile Pro Asp Arg Asn
 165 170 175

Glu Leu Leu Asp Met Leu Gly Gln Ala Ile His Tyr Leu Met Leu Gly
 180 185 190

Phe Leu Tyr Lys Phe Ile Leu Ala Tyr Ile Phe Gly Ser Leu Ile Met
 195 200 205

Pro Pro Leu Lys Glu Leu Ala Leu Glu Gln Gly Gly Val Phe Asn Trp
 210 215 220

Pro Thr Leu Gly Val Met Tyr Ala Phe Gly Phe Asp Leu Phe Phe Asp
 225 230 235 240

Phe Ala Gly Tyr Thr Met Phe Ala Leu Ala Ile Ser Asn Leu Met Gly
 245 250 255

Ile Lys Ser Pro Ile Asn Phe Asp Lys Pro Phe Lys Ser Arg Asp Leu
 260 265 270

Lys Glu Phe Trp Asn Arg Trp His Met Ser Leu Ser Phe Trp Phe Arg
 275 280 285

Asp Phe Val Phe Met Arg Leu Val Lys Leu Leu Val Lys Asn Lys Val
 290 295 300

Phe Lys Asn Arg Asn Val Thr Ser Ser Val Ala Tyr Ile Ile Asn Met
 305 310 315 320

Leu Leu Met Gly Phe Trp His Gly Leu Thr Trp Tyr Tyr Ile Ala Tyr
 325 330 335

Gly Leu Phe His Gly Ile Gly Leu Val Ile Asn Asp Ala Trp Val Arg
 340 345 350

Lys Lys Lys Asn Xaa Asn Lys Glu Arg Arg Leu Ala Lys Lys Pro Leu
 355 360 365

Leu Pro Glu Asn Lys Trp Thr Tyr Ala Leu Gly Val Phe Ile Thr Phe
 370 375 380

Asn Val Val Met Phe Ser Phe Leu Ile Phe Ser Gly Phe Leu Asp Leu
 385 390 395 400

Leu Trp Phe Pro Gln Pro His Asn Lys
 405

<210> 32

<211> 100

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (99)

<223>

<400> 32

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| atg | aat | aaa | ata | acg | aca | tta | tca | acc | atc | gcc | ctg | act | tta | atg | ctt | 48 |
| Met | Asn | Lys | Ile | Thr | Thr | Leu | Ser | Thr | Ile | Ala | Leu | Thr | Leu | Met | Leu | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| tgc | gtt | gga | tgt | tct | gcc | aat | aaa | gat | aat | caa | aaa | act | aaa | act | gag | 96 |
| Cys | Val | Gly | Cys | Ser | Ala | Asn | Lys | Asp | Asn | Gln | Lys | Thr | Lys | Thr | Glu | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | |
|-----|---|-----|
| gat | c | 100 |
| Asp | | |

<210> 33

<211> 33

<212> PRT

<213> Streptococcus agalactiae

<400> 33

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Met | Asn | Lys | Ile | Thr | Thr | Leu | Ser | Thr | Ile | Ala | Leu | Thr | Leu | Met | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Val | Gly | Cys | Ser | Ala | Asn | Lys | Asp | Asn | Gln | Lys | Thr | Lys | Thr | Glu |
| | | | 20 | | | | | 25 | | | | | 30 | | |

Asp

<210> 34

<211> 654

<212> DNA

<213> Streptococcus agalactiae

<220>

<221> CDS

<222> (1) .. (654)

<223>

<400> 34

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| gat | cga | ggc | tat | caa | gaa | gca | atg | gct | aaa | cta | agg | aaa | act | tac | ggc | 48 |
| Asp | Arg | Gly | Tyr | Gln | Glu | Ala | Met | Ala | Lys | Leu | Arg | Lys | Thr | Tyr | Gly | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|
| gaa | tat | ggg | tta | ggg | gtt | tct | aca | gga | tta | gat | tta | cct | gaa | tca | gaa | 96 |
| Glu | Tyr | Gly | Leu | Gly | Val | Ser | Thr | Gly | Leu | Asp | Leu | Pro | Glu | Ser | Glu | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ggg | tat | gta | cct | gga | aaa | tac | agc | tta | gga | aca | act | cta | atg | gaa | tcg | 144 |
| Gly | Tyr | Val | Pro | Gly | Lys | Tyr | Ser | Leu | Gly | Thr | Thr | Leu | Met | Glu | Ser | |
| | | 35 | | | | | 40 | | | | | 45 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ttc | ggg | cag | tat | gat | gcc | tat | aca | cca | atg | caa | ctt | ggg | cag | tat | atc | 192 |
| Phe | Gly | Gln | Tyr | Asp | Ala | Tyr | Thr | Pro | Met | Gln | Leu | Gly | Gln | Tyr | Ile | |
| | 50 | | | | | 55 | | | | | 60 | | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| tca | act | att | gcg | aat | aat | ggg | aat | cgt | tta | gca | cct | cac | gtg | gtt | tca | 240 |
| Ser | Thr | Ile | Ala | Asn | Asn | Gly | Asn | Arg | Leu | Ala | Pro | His | Val | Val | Ser | |
| 65 | | | | 70 | | | | 75 | | | | | | 80 | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gat | atc | tat | gaa | ggg | aat | gat | tct | aat | aag | ttc | gct | caa | ttg | gtt | cgt | 288 |
| Asp | Ile | Tyr | Glu | Gly | Asn | Asp | Ser | Asn | Lys | Phe | Ala | Gln | Leu | Val | Arg | |
| | | | 85 | | | | | 90 | | | | | 95 | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| tca | atc | act | cct | aaa | aca | cta | aat | aag | ata | gct | atc | tca | gat | caa | gag | 336 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|

Ser Ile Thr Pro Lys Thr Leu Asn Lys Ile Ala Ile Ser Asp Gln Glu
 100 105 110

tta gcc att att caa gaa ggt ttt tat aac gtt gtc aat agt gga agt 384
 Leu Ala Ile Ile Gln Glu Gly Phe Tyr Asn Val Val Asn Ser Gly Ser
 115 120 125

ggc tat gca act ggt acg tca atg agg ggg aat gtg aca acc att agy 432
 Gly Tyr Ala Thr Gly Thr Ser Met Arg Gly Asn Val Thr Thr Ile Ser
 130 135 140

ggc aaa act ggt acc gct gaa aca ttt gct aaa aat ata aat gga caa 480
 Gly Lys Thr Gly Thr Ala Glu Thr Phe Ala Lys Asn Ile Asn Gly Gln
 145 150 155 160

aca gtt tct acc tac aac tta aac gct att gcc tac gat act aat cgt 528
 Thr Val Ser Thr Tyr Asn Leu Asn Ala Ile Ala Tyr Asp Thr Asn Arg
 165 170 175

aaa ata gca gta gcg gta atg tat ccg cat gtt aca act gat aca aca 576
 Lys Ile Ala Val Ala Val Met Tyr Pro His Val Thr Thr Asp Thr Thr
 180 185 190

aaa tcc cat caa tta gtt gca cga gat atg att gat caa tat att tca 624
 Lys Ser His Gln Leu Val Ala Arg Asp Met Ile Asp Gln Tyr Ile Ser
 195 200 205

cag tca cag gac aat aag aga gga cat tga 654
 Gln Ser Gln Asp Asn Lys Arg Gly His
 210 215

<210> 35

<211> 217

<212> PRT

<213> Streptococcus agalactiae

<400> 35

Asp Arg Gly Tyr Gln Glu Ala Met Ala Lys Leu Arg Lys Thr Tyr Gly
 1 5 10 15

Glu Tyr Gly Leu Gly Val Ser Thr Gly Leu Asp Leu Pro Glu Ser Glu
 20 25 30

Gly Tyr Val Pro Gly Lys Tyr Ser Leu Gly Thr Thr Leu Met Glu Ser
 35 40 45

Phe Gly Gln Tyr Asp Ala Tyr Thr Pro Met Gln Leu Gly Gln Tyr Ile
 50 55 60

Ser Thr Ile Ala Asn Asn Gly Asn Arg Leu Ala Pro His Val Val Ser
 65 70 75 80

Asp Ile Tyr Glu Gly Asn Asp Ser Asn Lys Phe Ala Gln Leu Val Arg
 85 90 95

Ser Ile Thr Pro Lys Thr Leu Asn Lys Ile Ala Ile Ser Asp Gln Glu
 100 105 110

Leu Ala Ile Ile Gln Glu Gly Phe Tyr Asn Val Val Asn Ser Gly Ser
 115 120 125

Gly Tyr Ala Thr Gly Thr Ser Met Arg Gly Asn Val Thr Thr Ile Ser
 130 135 140

Gly Lys Thr Gly Thr Ala Glu Thr Phe Ala Lys Asn Ile Asn Gly Gln
 145 150 155 160

Thr Val Ser Thr Tyr Asn Leu Asn Ala Ile Ala Tyr Asp Thr Asn Arg
 165 170 175

Lys Ile Ala Val Ala Val Met Tyr Pro His Val Thr Thr Asp Thr Thr
 180 185 190

Lys Ser His Gln Leu Val Ala Arg Asp Met Ile Asp Gln Tyr Ile Ser
 195 200 205

Gln Ser Gln Asp Asn Lys Arg Gly His
 210 215